

**HETERODYNE FREQUENCY MODULATED SIGNAL  
DEMODULATOR AND METHOD OF OPERATING THE SAME**

**ABSTRACT OF THE DISCLOSURE**

5       A heterodyne interferometer, adaptive optics system, method of measuring movement of a target and/or variations in a beam propagation medium, and method of controlling an adaptive optics system are provided. The heterodyne interferometer includes an acoustic-optical modulator that can superimpose a RF signal on a source signal, and output a zero order beam and a higher order beam. One of the beams  
10      comprises a target beam and the other beam comprises a local oscillator beam. A telescope can receive the target beam, and direct the target beam through the beam propagation medium to the target. A beam splitter can receive the local oscillator beam and the reflected beam from the target, and coherently combine the local oscillator beam and the reflected beam to produce a fringe pattern. A detector can  
15      receive the fringe pattern and generate an electrical beat signal, which can be demodulated based upon the RF signal.